[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No.: FAA-2013-0109; Notice No. 25-137]

RIN 2120–AK13

Harmonization of Airworthiness Standards—Miscellaneous Structures Requirements

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to amend certain airworthiness regulations for transport category airplanes, based on recommendations from the Aviation Rulemaking Advisory Committee (ARAC). Adopting this proposal would eliminate regulatory differences between the airworthiness standards of the FAA and European Aviation Safety Agency (EASA). This proposal would not add new requirements beyond what manufacturers currently meet for EASA certification and would not affect current industry design practices. This proposal would revise the structural test requirements necessary when analysis has not been found reliable; clarify the quality control, inspection, and testing requirements for critical and non-critical castings; add control system requirements that consider structural deflection and vibration loads; expand the fuel tank structural and system requirements regarding emergency landing conditions and landing gear failure conditions; add a requirement that engine mount failure due to overload must not cause hazardous fuel spillage; and revise the inertial forces

requirements for cargo compartments by removing the exclusion of compartments located below or forward of all occupants in the airplane.

DATES: Send comments on or before [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Send comments identified by docket number FAA-2013-0109 using any of the following methods:

- Federal eRulemaking Portal: Go to http://www.regulations.gov and follow the online instructions for sending your comments electronically.
- Mail: Send comments to Docket Operations, M-30; U.S. Department of Transportation (DOT), 1200 New Jersey Avenue S.E., Room W12-140, West Building Ground Floor, Washington, D.C. 20590-0001.
- Hand Delivery or Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue S.E., Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at (202) 493-2251.

Privacy: The FAA will post all comments it receives, without change, to http://www.regulations.gov, including any personal information the commenter provides. Using the search function of the docket web site, anyone can find and read the electronic form of all comments received into any FAA dockets, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal

Register published on April 11, 2000 (65 FR 19477-19478), as well as at http://DocketsInfo.dot.gov.

Docket: Background documents or comments received may be read at http://www.regulations.gov at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue S.E., Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning this action, contact Todd Martin, Airframe and Cabin Safety Branch, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, Federal Aviation Administration, 1601 Lind Avenue S.W., Renton, WA 98057-3356; telephone (425) 227-1178; facsimile (425) 227-1232; e-mail Todd.Martin@faa.gov.

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SUPPLEMENTARY INFORMATION:

Authority for this Rulemaking

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

This rulemaking is promulgated under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General Requirements." Under that section, the FAA is charged with promoting safe flight of civil aircraft in air commerce by prescribing regulations and minimum standards for the design and performance of aircraft that the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority. It prescribes new safety standards for the design and operation of transport category airplanes.

I. Background

Part 25 of Title 14, Code of Federal Regulations (14 CFR) prescribes airworthiness standards for type certification of transport category airplanes, for products certified in the United States. Book 1 of the EASA Certification Specifications and Acceptable Means of Compliance for Large Aeroplanes (CS-25) prescribes the corresponding airworthiness standards for products certified in Europe. While part 25 and CS-25 Book 1 are similar, they differ in several respects. The necessity of meeting two sets of certification requirements raises the cost of developing new transport category airplanes with little to no increase in safety. Therefore, the FAA tasked ARAC through the Loads and Dynamics Harmonization Working Group (LDHWG) and the General Structures Harmonization Working Group (GSHWG) to review existing structures regulations and recommend changes that would eliminate differences between the U.S. and European airworthiness standards, while maintaining or improving the level of safety in the current regulations. This proposed rule is a result of this harmonization effort.

The LDHWG and GSHWG developed recommendations, which EASA has incorporated into CS-25 with some changes. The FAA agrees with the ARAC

recommendations as adopted by EASA, and we propose to amend part 25 accordingly. The proposals are not expected to be controversial and should reduce certification costs to industry without adversely affecting safety. The complete analyses for the proposed changes made in response to ARAC recommendations can be found in the ARAC recommendation reports, located in the docket for this rulemaking.

II. Overview of Proposed Rule

The FAA proposes to amend the airworthiness regulations described below. This action would harmonize part 25 requirements with the corresponding requirements in EASA CS-25 Book 1.

1. Section 25.307(a), "Proof of structure," would be revised to allow a "sufficient" level of structural testing, in some cases less than ultimate, when analysis has not been shown to be reliable.
2. Section 25.621, "Casting factors," would be revised to clarify the—
    - Definition of critical casting and
    - Quality control, inspection, and testing requirements for critical and non-critical castings.
3. Section 25.683, "Operation tests," would be revised to add a requirement that—
    - The control system must remain free from jamming, friction, disconnection, and permanent damage in the presence of structural deflection and
    - Under vibration loads, no hazard may result from interference or contact of the control system with adjacent elements.
4. Section 25.721, "Landing Gear—General," would be revised to—

- Expand the landing gear failure conditions to include side loads, in addition to up and aft loads, and expand this requirement to include nose landing gear in addition to the main landing gear,
- Specify that the wheels-up landing conditions are assumed to occur at a descent rate of 5 feet per second,
- Add a sliding-on-ground condition, and
- Require the engine mount be designed so that, when it fails due to overload, this failure does not cause the spillage of enough fuel to constitute a fire hazard.

5. Section 25.787, "Stowage compartments," would be revised to expand the inertia forces requirements for cargo compartments by removing the exclusion of compartments located below or forward of all occupants in the airplane.

6. Section 25.963, "Fuel tanks: general," would be revised to—

- Require that fuel tanks be designed so that no fuel is released in or near the fuselage, or near the engines, in quantities that would constitute a fire hazard in otherwise survivable emergency landing conditions,
- Define fuel tank pressure loads for fuel tanks located within and outside the fuselage pressure boundary and near the fuselage or near the engines, and
- Specify the wheels-up landing conditions and landing gear and engine mount failure conditions that must be considered when evaluating fuel tank structural integrity.

7. Section 25.994, "Fuel system components," would be revised to specify the wheels-up landing conditions to be considered when evaluating fuel system components.

III. Discussion of the Proposal

A. Section 25.307(a), "Proof of structure"

Section 25.307(a) currently requires that applicants for a type design conduct strength testing unless structural analysis has been shown to be reliable. When analysis has not been shown to be reliable, the regulation states that the FAA "may require ultimate load tests in cases where limit load tests may be inadequate."

Rather than specifying "limit load" or "ultimate load," the GSHWG proposed that the harmonized requirement state that substantiating load tests must be made that are "sufficient" to verify structural behavior up to the load levels required by § 25.305 (strength and deformation). Where it is justified, these test load levels may be less than ultimate.

We propose to revise § 25.307(a) to state that, when analysis has not been shown to be reliable, tests must be conducted to "sufficient" load levels. Normally, testing to ultimate load levels is required, but when previous relevant test evidence can be used to support the analysis, then a lower level of testing may be accepted. The proposed rule would allow this intermediate level of testing. While the rule has changed, the intent remains the same: to ensure that the structure will not have any structural deformation under limit load or any failure under ultimate load.

This action would harmonize § 25.307(a) with the corresponding EASA standard.

B. Section 25.621, "Casting factors"

Section 25.621 currently requires classification of structural castings as either critical or non-critical, and depending on classification, specifies inspection requirements, test requirements, and casting factors for strength and deformation. These casting factors

are applied in addition to the factor of safety required by § 25.303, "Factor of safety." The application of factors of safety to castings is necessary because the casting process can be inconsistent. Castings are subject to variability in mechanical properties due to this casting process, which can result in imperfections (such as voids) within the cast part.

We propose to revise § 25.621 to define "critical casting" and to clarify the quality control, inspection, and testing requirements for critical and non-critical castings. The proposed rule would specify the inspection and testing requirements based on the casting factor chosen by the applicant—from 1.0 to 2.0 or greater.

Section 25.621 currently requires that critical castings in structural applications have a minimum casting factor of 1.25. A casting factor of 1.0 would be allowed by the proposed rule, as described below, because casting technology has improved since the current § 25.621 was adopted, and much higher quality castings can be produced using improved foundry methods. The proposed rule would require the following for critical castings:

- A visual and special non-destructive inspections. The special non-destructive inspections would be limited to specified areas of the casting where defects are likely to occur.
- A casting factor of 1.5 or greater would be allowed provided that one casting undergoes static testing and is shown to meet the relevant strength and deformation requirements. A casting factor of 1.25 or greater would be allowed provided that three castings undergo static testing and are shown to meet the relevant strength and deformation requirements.

- A casting factor of 1.0 or greater would be allowed provided that one casting undergoes static testing and is shown to meet the relevant strength and deformation requirements, and it is demonstrated that a process is in place to ensure the castings produced have material variation equivalent to those of wrought alloy products of similar composition. Draft Advisory Circular (AC) 25.621-X, "Casting Factors," will be published concurrently with this NPRM. This draft AC outlines a process for using a casting factor of 1.0, including any changes to that process that may occur over time. The proposed rule requires "process monitoring," which is intended to mean continuous process monitoring for the entire production lifecycle.

The proposed rule would also specify quality control, inspection, and testing requirements for non-critical castings with casting factors ranging from 1.0 to 2.0 or greater.

C. Section 25.683, "Operation tests"

Section 25.683 currently requires the airplane control system to be free from jamming, excessive friction, and excessive deflection when subjected to pilot effort and control system loads. We propose to revise § 25.683 by adding a requirement to substantiate that, in the presence of deflections of the airplane structure due to maneuver loads, the control system can be exercised and remain free from jamming, friction, disconnection, and any form of permanent damage. In addition, we propose adding a requirement to substantiate that, under vibration loads, no interference or contact of the control system with adjacent elements can result in hazard.

Since control systems are typically attached or routed through adjacent aircraft structure, it is necessary to ensure that deflections of that adjacent structure do not adversely affect the safe operation of the control system through interference, jamming, or induced loading. Also, the control system design should be such that the effects of vibration loads in normal flight and ground operating conditions will not affect the safe operation of the control system.

These actions would harmonize § 25.683 with the corresponding EASA standard.

D. Section 25.721, "Landing Gear—General (emergency landing conditions)"

Section 25.721(a) currently requires that the main landing gear system be designed so that if it fails due to overloads during takeoff and landing, the failure does not cause the spillage of enough fuel to constitute a fire hazard. This is intended to protect fuel tanks from rupture and puncture due to the failure of the landing gear and its supports. This requirement applies only to fuel systems inside the fuselage for airplanes with 9 seats or less, and all fuel systems for airplanes with 10 seats or more. We propose to revise § 25.721(a) to:

1. Apply to the nose landing gear as well as the main landing gear,
2. Clarify that landing gear failure is assumed,
3. Expand the failure conditions to include side loads, in addition to up and aft loads, and
4. Remove the exception for airplanes with less than 10 seats.

We propose revising § 25.721(a) to apply to the nose gear as well as the main landing gear because nose gear failures can also impact fuel tanks. We would also clarify that landing gear failure is assumed by stating that the design must consider such failures

"when" they occur, rather than "if" they occur. This clarification is needed because in some past cases, applicants relied on over-designing the landing gear beyond ultimate strength requirements rather than showing safe separation in the event of failure.

We would expand the failure conditions to consider side loads to ensure that a comprehensive range of failure conditions are considered. Lastly, we would remove the exception for airplanes with less than 10 seats.

This exception in § 25.721 was originally introduced at Amendment 25-32 (37 FR 3969, February 24, 1972). In the preamble to that final rule, the FAA determined that:

> [C]ertain of the requirements in proposed Secs. 25.562, 25.721, 25.787, 25.807, and 25.812 are inappropriate and unnecessary, or are unnecessarily severe, for transport category airplanes that have maximum passenger seating configurations, excluding pilots seats, of nine seats or less. In those instances, the proposed requirements have been revised to provide exceptions and to include requirements for such airplanes that provide a level of safety for such airplanes equivalent to that for airplanes with larger passenger seating configurations.

This exception is appropriate for certain cabin safety provisions that necessitate the egress of large numbers of passengers. However, the FAA believes that for the hazards associated with fuel fires, there is no technical justification for limiting the applicability of any of the fuel tank protection provisions based on the passenger seating capacity.

Section 25.721(b) currently states that airplanes must be able to land on a paved runway, with any one or more landing gear legs not extended, without failures that result in spillage of enough fuel to constitute a fire hazard. This condition is not intended to

treat a collapsed gear condition, but is intended to cover cases in which one or more gear legs do not extend for whatever reason, and the airplane must make a controlled landing on a paved runway in this condition. The current requirement applies only to airplanes with 10 seats or more. We propose to revise § 25.721(b) to:

1. Specify that the wheels-up landing conditions are assumed to occur at a descent rate of 5 feet per second,
2. Clarify the combinations of retracted landing gear that must be considered,
3. Add a sliding-on-ground condition, and
4. Remove the exception for airplanes with less than 10 seats.

At the time § 25.721(b) was adopted by Amendment 25-32 (37 FR 3969, February 24, 1972), § 25.561 contained a landing descent speed of "5 feet per second" as an alternative criterion that could allow a reduction in the specified vertical emergency landing design load factor. Amendment 25-64 (53 FR 17646, May 17, 1988) removed this alternative to make the specified vertical design load factor the minimum design condition. However, the 5-feet-per-second descent speed contained in § 25.561 had become, by design practice and interpretation, the design descent velocity for the wheels-up landing conditions addressed in §§ 25.721 and 25.994. By removing it, the quantitative definition of the wheels-up landing condition on a paved runway was lost. We propose to revise § 25.721(b) to re-establish the 5-feet-per-second descent rate for the "minor crash landing" condition.

We would add a sliding-on-ground condition to ensure that the wheels-up landing conditions are evaluated beyond the initial impact. The exception for airplanes with less than 10 seats would be removed from § 25.721(a) and (b) as noted above.

We propose to replace § 25.721(c) with a new requirement that the engine mount and pylon be designed so that, when it fails due to overload, the failure mode is not likely to cause the spillage of enough fuel to constitute a fire hazard. Service experience has shown that landing gear malfunctions can lead to the airplane landing on the engine nacelles for some configurations. This can result in the engine nacelle breaking away, creating much the same fuel tank rupture potential as the landing gear breaking away.

These actions would harmonize § 25.721 with the corresponding EASA standard.

E. Section 25.787(a), "Stowage compartments"

Section 25.787(a) currently requires that cargo compartments be designed to the emergency landing conditions of § 25.561(b), but excludes compartments located below or forward of all occupants in the airplane. We propose to revise § 25.787(a) to include compartments located below or forward of all occupants in the airplane. This change would ensure that, in these compartments, inertia forces in the up and aft direction will not injure passengers, and inertia forces in any direction will not cause penetration of fuel tanks or lines, or cause other hazards. This action would harmonize § 25.787(a) with the corresponding EASA standard.

The LDHWG originally recommended that § 25.561(c) be revised to achieve this objective of addressing cargo compartments below or forward of airplane occupants. However, when evaluating the LDHWG recommendation, EASA determined that CS 25.787 already addressed the issue and noted that § 25.787(a) and CS 25.787(a) were different in this regard. Separately, ARAC also tasked the Cabin Safety Harmonization Working Group with reviewing § 25.787, and that group also recommended that the FAA

harmonize § 25.787(a) with CS 25.787(a). The FAA agrees that the change should be made to § 25.787(a), rather than § 25.561.

F. Section 25.963(d), "Fuel tanks: general (emergency landing conditions)"

Section 25.963(d) currently requires that fuel tanks within the fuselage contour be able to resist rupture and retain fuel under the inertia forces defined in § 25.561. In addition, these tanks must be in a protected position so that exposure of the tanks to scraping action with the ground is unlikely. We propose to revise § 25.963(d), as described below, based on recommendations provided by the LDHWG.

1. The introductory sentence to § 25.963(d) would require that, "so far as it is practicable," fuel tanks be designed, located and installed so that no fuel is released in or near the fuselage, or near the engines, in quantities that would constitute a fire hazard in "otherwise survivable emergency landing conditions." This is considered a general requirement, while more specific criteria are provided in § 25.963(d)(1) through (d)(5). The term "practicable" here means that any feasible or workable design should be considered in order to protect the fuel tanks. The phrase "otherwise survivable emergency landing conditions" is not specifically quantified. However, past events should be considered in developing a robust fuel tank design.

2. Section 25.963(d)(1) through (d)(3) would define fuel tank pressure loads for fuel tanks located within and outside the fuselage pressure boundary, and near the fuselage or near the engines, as described below.

The LDHWG recommended revising § 25.963(d) to delete the reference to § 25.561 for emergency landing load factors, which are used to develop the fuel tank pressure loads. The emergency landing load factors of § 25.561(b)(3) are based upon the

restraint of fixed mass items, and the response of a fluid during emergency landings is different and much more complex to quantify. The proposed requirements for fuel tanks both within and outside of the fuselage pressure boundary have been simply formulated in terms of equations with factors that are justified based upon the satisfactory service experience of the existing fleet.

The current regulation addresses only fuel tanks within the fuselage contour, although the FAA has issued special conditions to require fuel inertia loading conditions on horizontal tail tanks outside the fuselage contour.

The LDHWG determined that the safety record for fuel tank rupture caused solely by fuel inertia loads is excellent. Manufacturers' records of accidents and serious incidents involving large transport airplanes showed no event where fuel inertia pressure caused significant loss of fuel. Fuel losses that did occur were mainly caused by direct impact and external-object punctures.

Nevertheless, a fuel inertia criterion for wing fuel tanks is needed to ensure that future designs meet the same level of safety achieved by the current fleet. The wing fuel tanks of many current aircraft types were designed to a simple criterion in which fuel pressure was calculated using an inertia head equal to the local geometrical stream-wise distance between the fuel tank solid boundaries. Service experience has shown this criterion produces fuel tank designs with an acceptable level of safety. Therefore, it is appropriate that the future airworthiness standards for fuel tanks should require a similar level of design fuel pressure for similar fuel tank designs.

For fuel tanks within the fuselage pressure boundary, the current fuel inertia load criterion, as generally applied, covers up to a full fuel tank, an inertia head equal to

maximum pressure head, and inertia load factors equal to those of § 25.561(b)(3). This level of rupture resistance for fuel tanks is justified based upon occupant survivability considerations. Therefore, the LDHWG recommended, and the FAA concurs, that the current minimum level of rupture resistance should be retained for fuel tanks within the fuselage pressure boundary. For fuel tanks outside the fuselage pressure boundary, the design load factors for the inboard and outboard (lateral) loading conditions and forward loading conditions are proposed as one-half of those for fuel tanks within the fuselage. The design load factors for the up, down, and aft loading conditions would be the same for all fuel tanks.

When EASA adopted the LDHWG recommendations, it noted an objection that had been raised by the Joint Aviation Authorities (JAA) Power Plant Study Group (PPSG). The PPSG did not agree with the LDHWG recommendation regarding fuel tank pressure loads for fuel tanks "near the fuselage or near the engines," which had been specifically addressed by Joint Aviation Regulation. In response to the PPSG objection, EASA added criteria for fuel tanks near the fuselage and near the engines. We agree with these criteria and propose to add the same to § 25.963(d).

3. Section 25.963(d)(4) would require that the effects of crushing and scraping actions with the ground not cause fuel spillage, or generate temperatures that would constitute a fire hazard under the conditions specified in proposed § 25.721(b). By reference to § 25.721(b), this rule would require consideration of the 5 feet-per-second wheels-up landing criteria and subsequent sliding on the ground. The potential effects of crushing and scraping, including thermal effects, must be evaluated for these minor crash landing conditions.

4. Section 25.963(d)(5) would require that fuel tank installations be such that the tanks will not rupture as a result of an engine pylon or engine mount or landing gear tearing away as specified in proposed § 25.721(a) and (c). This requirement would be largely redundant to the proposed § 25.721(a) and (c), but is included in § 25.963(d) for completeness.

These actions would harmonize § 25.963(d) with the corresponding EASA standard with the following two exceptions:

CS 25.963(d) requires that fuel tanks be designed and located so that no fuel is released in quantities "sufficient to start a serious fire" in otherwise survivable emergency landing conditions. The proposed rule would require that no fuel is released in quantities "that would constitute a fire hazard." The two phrases have the same intent and meaning, and the latter phrase is consistent with the wording in CS 25.721/§ 25.721, CS 25.963(d)(4)/§ 25.963(d)(4), and CS 25.994/§ 25.994.

The fuel tank pressure criteria in CS 25.963(d) vary depending on whether the fuel tank is "within the fuselage contour" or "outside the fuselage contour." The proposed rule would be more specific by referring to "those parts of fuel tanks within the fuselage pressure boundary or that form part of the fuselage pressure boundary" versus "those parts of fuel tanks outside the fuselage pressure boundary." The proposed wording is clearer and has the same intent and meaning as that specified in CS 25.963(d).

G. Section 25.994, "Fuel system components"

Section 25.994 currently requires that fuel system components in an engine nacelle or in the fuselage be protected from damage that could result in spillage of enough fuel to constitute a fire hazard as a result of a wheels-up landing on a paved

runway. We propose to revise § 25.994 to specify that the wheels-up landing conditions that must be considered are those defined in proposed § 25.721(b). This action would harmonize § 25.994 with the corresponding EASA standard.

As noted previously, the 5-feet-per-second descent speed contained in an earlier amendment to § 25.561 had become, by design practice and interpretation, the design descent velocity for the wheels-up landing conditions addressed in §§ 25.721 and 25.994. In fact, Advisory Circular (AC) 25.994-1, "Design Considerations to Protect Fuel Systems During a Wheel-Up Landing," dated July 24, 1986, specifically referred to § 25.561 for the design conditions, which at that time contained the 5-feet-per-second landing descent criteria.

H. Advisory Material

The FAA is developing three new proposed ACs to be published concurrently with the proposed regulations in this NPRM. The proposed ACs would provide guidance material for acceptable means, but not the only means, of demonstrating compliance with proposed §§ 25.307, 25.561, 25.621, 25.721, 25.963, and 25.994. We will accept public comments to the following proposed ACs on the "Aviation Safety Draft Documents Open for Comment" Internet web site at http://www.faa.gov/aircraft/draft_docs/:

- AC 25-X, "Fuel Tank Strength in Emergency Landing Conditions." (AC 25-X would provide guidance for the fuel tank structural integrity requirements of §§ 25.561, 25.721, and 25.963.)
- AC 25.307-X, "Proof of Structure."
- AC 25.621-X, "Casting Factors."

IV. Regulatory Notices and Analyses

A. Regulatory Evaluation

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 and Executive Order 13563 direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Public Law 96-354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Public Law 96-39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, the Trade Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Public Law 104-4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impacts of this proposed rule.

Department of Transportation Order DOT 2100.5 prescribes policies and procedures for simplification, analysis, and review of regulations. If the expected cost impact is so minimal that a proposed or final rule does not warrant a full evaluation, this order permits that a statement to that effect and the basis for it be included in the preamble if a full regulatory evaluation of the cost and benefits is not prepared. Such a

determination has been made for this proposed rule. The reasoning for this determination follows.

The FAA proposes to amend certain airworthiness standards for transport category airplanes. Adopting this proposal would eliminate regulatory differences between the airworthiness standards of the FAA and EASA. This proposal would not add new requirements beyond what manufacturers currently meet for EASA certification and would not affect current industry design practices. Meeting two sets of certification requirements raises the cost of developing new transport category airplanes with little to no increase in safety. In the interest of fostering international trade, lowering the cost of manufacturing new transport category airplanes, and making the certification process more efficient, the FAA, EASA, and several industry working groups came together to create, to the maximum extent possible, a single set of certification requirements that would be accepted in both the United States and Europe. Therefore, as a result of these harmonization efforts, the FAA proposes to amend the airworthiness regulations described in section II of this NPRM, "Overview of the Proposed Rule." This action would harmonize part 25 requirements with the corresponding requirements in EASA CS-25 Book 1.

Currently, all manufacturers of transport category airplanes, certificated under part 25 are expected to continue their current practice of compliance with the EASA certification requirements in CS-25 Book 1. Since future certificated transport airplanes are expected to meet CS-25 Book 1, and this rule simply adopts the same EASA requirements, manufacturers will incur minimal or no additional cost resulting from this

proposed rule. Therefore, the FAA estimates that there are no additional costs associated with this proposed rule.

In fact, manufacturers could receive cost savings because they will not have to build and certificate transport category airplanes to two different authorities' certification specifications and rules.

The FAA, however, has not attempted to quantify the cost savings that may accrue from this rule, beyond noting that while they may be minimal, they contribute to a potential harmonization savings. The agency concludes that because the compliance cost for this proposed rule is minimal and there may be harmonization cost savings, further analysis is not required.

The FAA has, therefore, determined that this proposed rule is not a ''significant regulatory action'' as defined in section 3(f) of Executive Order 12866, and is not ''significant'' as defined in DOT's Regulatory Policies and Procedures.

B. Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Public Law 96-354) (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration." The RFA covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

However, if an agency determines that a rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify, and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The FAA believes that this rule would not have a significant economic impact on a substantial number of small entities for the following reason. The net effect of this rule is minimum regulatory cost relief as the proposed rule would adopt those EASA requirements that industry already complies with. Moreover, manufacturers of part 25 airplanes are not small entities. Because those manufacturers already meet or expect to meet this CS-25 standard as well as the existing CFR requirement, the net effect of this proposed rule is regulatory cost relief.

Because manufacturers of transport category airplanes are not small entities, this proposed rule is expected to have minimal to no additional costs, and could be cost-relieving, as the acting FAA Administrator, I certify that this proposed rule would not have a significant economic impact on a substantial number of small entities.

C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Public Law 96-39), as amended by the Uruguay Round Agreements Act (Public Law 103-465), prohibits Federal agencies from

establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this proposed rule and determined that it is in accord with the Trade Agreements Act as the rule uses European standards as the basis for United States regulation.

D. Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Public Law 104-4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (in 1995 dollars) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action." The FAA currently uses an inflation-adjusted value of $143.1 million in lieu of $100 million. This proposed rule does not contain such a mandate; therefore, the requirements of Title II of the Act do not apply.

E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. The FAA has determined that there would be no new requirement for information collection associated with this proposed rule.

F. International Compatibility and Cooperation

(1) In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no differences with these proposed regulations.

(2) Executive Order (EO) 13609, Promoting International Regulatory Cooperation, (77 FR 26413, May 4, 2012) promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and reduce, eliminate, or prevent unnecessary differences in regulatory requirements. The FAA has analyzed this action under the policy and agency responsibilities of Executive Order 13609, Promoting International Regulatory Cooperation. The agency has determined that this action would eliminate differences between U.S. aviation standards and those of other civil aviation authorities by creating a single set of certification requirements for transport category airplanes that would be acceptable in both the United States and Europe.

G. Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312f of Order 1050.1E and involves no extraordinary circumstances.

V. Executive Order Determinations

A. Executive Order 13132, Federalism

The FAA has analyzed this proposed rule under the principles and criteria of Executive Order 13132, Federalism. The agency has determined that this action would not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, would not have Federalism implications.

B. Executive Order 13211, Regulations that Significantly Affect Energy Supply, Distribution, or Use

The FAA analyzed this proposed rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). The agency has determined that it would not be a "significant energy action" under the executive order and would not be likely to have a significant adverse effect on the supply, distribution, or use of energy.

VI. Additional Information

A. Comments Invited

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. The agency also invites comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. To ensure the docket does not contain duplicate comments, commenters should send only one copy of written comments, or if comments are filed electronically, commenters should submit only one time.

The FAA will file in the docket all comments it receives, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. Before acting on this proposal, the FAA will consider all comments it receives on or before the closing date for comments. The FAA will consider comments filed after the comment period has closed if it is possible to do so without incurring expense or delay. The agency may change this proposal in light of the comments it receives.

Proprietary or Confidential Business Information: Commenters should not file proprietary or confidential business information in the docket. Such information must be sent or delivered directly to the person identified in the FOR FURTHER INFORMATION CONTACT section of this document, and marked as proprietary or confidential. If submitting information on a disk or CD ROM, mark the outside of the disk or CD ROM, and identify electronically within the disk or CD ROM the specific information that is proprietary or confidential.

Under 14 CFR 11.35(b), if the FAA is aware of proprietary information filed with a comment, the agency does not place it in the docket. It is held in a separate file to which the public does not have access, and the FAA places a note in the docket that it has received it. If the FAA receives a request to examine or copy this information, it treats it as any other request under the Freedom of Information Act (5 U.S.C. 552). The FAA processes such a request under Department of Transportation procedures found in 49 CFR part 7.

B. Availability of Rulemaking Documents

An electronic copy of rulemaking documents may be obtained from the Internet by—

1. Searching the Federal eRulemaking Portal at http://www.regulations.gov,
2. Visiting the FAA's Regulations and Policies web page at http://www.faa.gov/regulations_policies, or
3. Accessing the Government Printing Office's web page at http://www.gpo.gov/fdsys/.

Copies may also be obtained by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue S.W., Washington, DC 20591, or by calling (202) 267-9680. Commenters must identify the docket or notice number of this rulemaking.

All documents the FAA considered in developing this proposed rule, including economic analyses and technical reports, may be accessed from the Internet through the Federal eRulemaking Portal referenced in item (1) above.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend chapter I of title 14, Code of Federal Regulations as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, and 44704.

2. Amend § 25.307 by revising paragraph (a) to read as follows:

§ 25.307 Proof of structure.

(a) Compliance with the strength and deformation requirements of this subpart must be shown for each critical loading condition. Structural analysis may be used only if the structure conforms to that for which experience has shown this method to be reliable. In other cases, substantiating tests must be made to load levels that are sufficient to verify structural behavior up to loads specified in § 25.305.

* * * * *

3. Amend § 25.621 by revising paragraphs (a), (c), and (d) to read as follows:

§ 25.621 Casting factors.

(a) General. For castings used in structural applications, the factors, tests, and inspections specified in paragraphs (b) through (d) of this section must be applied in addition to those necessary to establish foundry quality control. The inspections must meet approved specifications. Paragraphs (c) and (d) of this section apply to any structural castings, except castings that are pressure tested as parts of hydraulic or other fluid systems and do not support structural loads.

(b) * * *

(c) Critical castings. Each casting whose failure could preclude continued safe flight and landing of the airplane or could result in serious injury to occupants is considered a critical casting. Each critical casting must have a factor associated with it for showing compliance with strength and deformation requirements, and must comply with the following criteria associated with that factor:

(1) A casting factor of 1.0 or greater may be used, provided that—

(i) It is demonstrated, in the form of process qualification, proof of product, and process monitoring that, for each casting design and part number, the castings produced by each foundry and process combination have coefficients of variation of the material properties that are equivalent to those of wrought alloy products of similar composition. Process monitoring must include testing of coupons cut from the prolongations of each casting (or each set of castings, if produced from a single pour into a single mold in a runner system) and, on a sampling basis, coupons cut from critical areas of production castings. The acceptance criteria for the process monitoring inspections and tests must be established and included in the process specifications to ensure the properties of the production castings are controlled to within levels used in design.

(ii) Each casting receives:

(A) Inspection of 100% of its surface, using visual and liquid penetrant, or equivalent, inspection methods; and

(B) Inspection of structurally significant internal areas and areas where defects are likely to occur, using radiographic, or equivalent, inspection methods.

(iii) One casting undergoes a static test and is shown to meet the strength and deformation requirements of § 25.305(a) and (b).

(2) A casting factor of 1.25 or greater may be used, provided that—

(i) Each casting receives:

(A) Inspection of 100% of its surface, using visual and liquid penetrant, or equivalent inspection methods; and

(B) Inspection of structurally significant internal areas and areas where defects are likely to occur, using radiographic, or equivalent, inspection methods.

(ii) Three castings undergo static tests and are shown to meet:

(A) The strength requirements of § 25.305(b) at an ultimate load corresponding to a casting factor of 1.25; and

(B) The deformation requirements of § 25.305(a) at a load of 1.15 times the limit load.

(3) A casting factor of 1.50 or greater may be used, provided that—

(i) Each casting receives:

(A) Inspection of 100% of its surface, using visual and liquid penetrant, or equivalent, inspection methods; and

(B) Inspection of structurally significant internal areas and areas where defects are likely to occur, using radiographic, or equivalent, inspection methods.

(ii) One casting undergoes a static test and is shown to meet:

(A) The strength requirements of § 25.305(b) at an ultimate load corresponding to a casting factor of 1.50; and

(B) The deformation requirements of § 25.305(a) at a load of 1.15 times the limit load.

(d) Non-critical castings. For each casting other than critical castings, as specified in paragraph (c) of this section, the following apply:

(1) A casting factor of 1.0 or greater may be used, provided that the requirements of (c)(1) of this section are met, or all of the following conditions are met:

(i) Castings are manufactured to approved specifications that specify the minimum mechanical properties of the material in the casting and provides for

demonstration of these properties by testing of coupons cut from the castings on a sampling basis.

(ii) Each casting receives:

(A) Inspection of 100% of its surface, using visual and liquid penetrant, or equivalent, inspection methods; and

(B) Inspection of structurally significant internal areas and areas where defects are likely to occur, using radiographic, or equivalent, inspection methods.

(iii) Three sample castings undergo static tests and are shown to meet the strength and deformation requirements of § 25.305(a) and (b).

(2) A casting factor of 1.25 or greater may be used, provided that each casting receives:

(i) Inspection of 100% of its surface, using visual and liquid penetrant, or equivalent, inspection methods; and

(ii) Inspection of structurally significant internal areas and areas where defects are likely to occur, using radiographic, or equivalent, inspection methods.

(3) A casting factor of 1.5 or greater may be used, provided that each casting receives inspection of 100% of its surface using visual and liquid penetrant, or equivalent, inspection methods.

(4) A casting factor of 2.0 or greater may be used, provided that each casting receives inspection of 100% of its surface using visual inspection methods.

(5) The number of castings per production batch to be inspected by non-visual methods in accordance with paragraphs (d)(2) and (d)(3) of this section may be reduced when an approved quality control procedure is established.

4. Amend § 25.683 by redesignating the introductory text as paragraph (a), redesignating paragraphs (a), (b), and (c) as paragraphs (a)(1), (a)(2), and (a)(3) respectively, and adding paragraphs (b) and (c) to read as follows:

§ 25.683 Operation tests.

(a) It must be shown by operation tests that when portions of the control system subject to pilot effort loads are loaded to 80% of the limit load specified for the system and the powered portions of the control system are loaded to the maximum load expected in normal operation, the system is free from—

(1) Jamming;

(2) Excessive friction; and

(3) Excessive deflection.

(b) It must be shown by analysis and, where necessary, by tests that in the presence of deflections of the airplane structure due to the separate application of pitch, roll, and yaw limit maneuver loads, the control system, when loaded to obtain these limit loads and operated within its operational range of deflections, can be exercised about all control axes and remain free from—

(1) Jamming;

(2) Excessive friction;

(3) Disconnection, and

(4) Any form of permanent damage.

(c) It must be shown that under vibration loads in the normal flight and ground operating conditions, no hazard can result from interference or contact with adjacent elements.

5. Revise § 25.721 to read as follows:

§ 25.721 General.

(a) The landing gear system must be designed so that when it fails due to overloads during takeoff and landing, the failure mode is not likely to cause spillage of enough fuel to constitute a fire hazard. The overloads must be assumed to act in the upward and aft directions in combination with side loads acting inboard and outboard. In the absence of a more rational analysis, the side loads must be assumed to be up to 20% of the vertical load or 20% of the drag load, whichever is greater.

(b) The airplane must be designed to avoid any rupture leading to the spillage of enough fuel to constitute a fire hazard as a result of a wheels-up landing on a paved runway, under the following minor crash landing conditions:

(1) Impact at 5 feet-per-second vertical velocity, with the airplane under control, at Maximum Design Landing Weight—

(i) With the landing gear fully retracted and, as separate conditions,

(ii) With any other combination of landing gear legs not extended.

(2) Sliding on the ground, with—

(i) The landing gear fully retracted and with up to a 20° yaw angle and, as separate conditions,

(ii) Any other combination of landing gear legs not extended and with 0° yaw angle.

(c) For configurations where the engine nacelle is likely to come into contact with the ground, the engine pylon or engine mounting must be designed so that when it fails due to overloads (assuming the overloads to act predominantly in the upward direction

and separately, predominantly in the aft direction), the failure mode is not likely to cause the spillage of enough fuel to constitute a fire hazard.

6. Amend § 25.787 by revising paragraph (a) to read as follows:

§ 25.787 Stowage compartments.

(a) Each compartment for the stowage of cargo, baggage, carry-on articles, and equipment (such as life rafts), and any other stowage compartment, must be designed for its placarded maximum weight of contents and for the critical load distribution at the appropriate maximum load factors corresponding to the specified flight and ground load conditions, and to the emergency landing conditions of § 25.561(b)(3) where the breaking loose of the contents of such compartments could—

(1) Cause direct injury to occupants;

(2) Penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems; or

(3) Nullify any of the escape facilities provided for use after an emergency landing.

If the airplane has a passenger-seating configuration, excluding pilot seats, of 10 seats or more, each stowage compartment in the passenger cabin, except for under seat and overhead compartments for passenger convenience, must be completely enclosed.

* * * * *

7. Amend § 25.963 by revising paragraph (d) to read as follows:

§ 25.963 Fuel tanks: general.

* * * * *

(d) Fuel tanks must, so far as it is practicable, be designed, located, and installed so that no fuel is released in or near the fuselage, or near the engines, in quantities that would constitute a fire hazard in otherwise survivable emergency landing conditions, and—

(1) Fuel tanks must be able to resist rupture and retain fuel under ultimate hydrostatic design conditions in which the pressure P within the tank varies in accordance with the formula:

$P = K\rho gL$

Where—

P = fuel pressure at each point within the tank

ρ = typical fuel density

g = acceleration due to gravity

L = a reference distance between the point of pressure and the tank farthest boundary in the direction of loading

K = 4.5 for the forward loading condition for those parts of fuel tanks outside the fuselage pressure boundary

K = 9 for the forward loading condition for those parts of fuel tanks within the fuselage pressure boundary, or that form part of the fuselage pressure boundary

K = 1.5 for the aft loading condition

K = 3.0 for the inboard and outboard loading conditions for those parts of fuel tanks within the fuselage pressure boundary, or that form part of the fuselage pressure boundary

K = 1.5 for the inboard and outboard loading conditions for those parts of fuel tanks outside the fuselage pressure boundary

K = 6 for the downward loading condition

K = 3 for the upward loading condition

(2) For those parts of wing fuel tanks near the fuselage or near the engines, the greater of the fuel pressures resulting from paragraphs (d)(2)(i) and (d)(2)(ii) of this section must be used:

(i) The fuel pressures resulting from paragraph (d)(1) of this section, and

(ii) The lesser of the two following conditions:

(A) Fuel pressures resulting from the accelerations as specified in § 25.561(b)(3) considering the fuel tank full of fuel at maximum fuel density. Fuel pressures based on the 9.0g forward acceleration may be calculated using the fuel static head equal to the streamwise local chord of the tank. For inboard and outboard conditions, an acceleration of 1.5g may be used in lieu of 3.0g as specified in § 25.561(b)(3), and

(B) Fuel pressures resulting from the accelerations as specified in § 25.561(b)(3) considering a fuel volume beyond 85% of the maximum permissible volume in each tank using the static head associated with the 85% fuel level. A typical density of the appropriate fuel may be used. For inboard and outboard conditions, an acceleration of 1.5g may be used in lieu of 3.0g as specified in § 25.561(b)(3).

(3) Fuel tank internal barriers and baffles may be considered as solid boundaries if shown to be effective in limiting fuel flow.

(4) For each fuel tank and surrounding airframe structure, the effects of crushing and scraping actions with the ground should not cause the spillage of enough fuel, or

generate temperatures that would constitute a fire hazard under the conditions specified in § 25.721(b).

(5) Fuel tank installations must be such that the tanks will not rupture as a result of an engine pylon or engine mount or landing gear, tearing away as specified in § 25.721(a) and (c).

* * * * *

8. Revise § 25.994 to read as follows:

§ 25.994 Fuel system components.

Fuel system components in an engine nacelle or in the fuselage must be protected from damage that could result in spillage of enough fuel to constitute a fire hazard as a result of a wheels-up landing on a paved runway under each of the conditions prescribed in § 25.721(b).

Issued in Washington, D.C., on February 14, 2013.

Dorenda D. Baker,
Director, Aircraft Certification Service

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